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INCREASING WEARING OF PRESCRIPTION GLASSES IN INDIVIDUALS WITH MENTAL RETARDATION

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This study evaluated an intervention for promoting wearing of prescription glasses in 4 individuals with mental retardation who had refused to wear their glasses previously. Distraction through noncontingent reinforcement (NCR) increased independent glasses wearing for 1 of the 4 participants. An intervention consisting of NCR, response cost, and brief response blocking (until 5 s without an attempt to remove glasses had elapsed) increased glasses wearing for the others. Partial component analyses revealed that different components of the package were sufficient or necessary to sustain glasses wearing across participants.

DESCRIPTORS: compliance, noncontingent reinforcement, prescription glasses, response blocking, response cost

The correction of visual impairments through prescription glasses can be complicated in various ways in persons with mental retardation. Not only can it be difficult to test visual acuity accurately for individuals with limited verbal skills (Kwok, Chan, Gandhi, & Lam, 1996), but it also may be difficult to compel individuals with mental retardation to wear prescription glasses. For example, Haugen, Aasved, and Bertelsen (1995) found that only 59% of 88 residents of a facility for individuals with mental retardation wore prescribed glasses with regularity after 6 months; 17% rejected the glasses and 24% did not receive the glasses because residential staff assumed that they would not wear them. Although no research has specifically addressed the reasons why many individuals with mental retardation do not wear their glasses, Wolf, Risley, and Mees (1964) suggested that the initial introduction of prescription lenses might be an irritant (changing all visual stimuli, forcing the eyes into greater accommodation). If so, glasses removal may provide escape from aversive stimulation.

Very few attempts at increasing glasses wearing through behavioral intervention have been reported and, even then, those studies employed lengthy shaping procedures (Lalli, Livezey, & Kates, 1996; Wolf et al., 1964). Alternatively, there is an extensive body of research on facilitating compliance with medical procedures that suggests other approaches for increasing wearing of glasses. One involves providing access to preferred stimuli or activities during medical procedures. Stark et al. (1989), for example, reduced children's disruptive behavior during dental procedures by presenting participants with a poster and telling them a story during treatment. Providing preferred stimuli is relatively simple and may facilitate compliance through a variety of mechanisms including distraction (i.e., promoting competing responses) or, when repeated over time, counterconditioning. Preferred stimuli also can be combined readily with response cost in which the preferred activities

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remain available only as long as the person is cooperative with the medical procedure. Slifer, Cataldo, Cataldo, Llorente, and Gerson (1993) used such a procedure to reduce children's head movements during training for neuroimaging.

The current investigation evaluated an intervention that contained elements of these approaches plus response blocking to increase compliance with wearing prescription glasses in 4 individuals with mental retardation. Component analyses were conducted with 3 participants to determine which treatment elements were necessary, sufficient, or both, and the maintenance of outcomes was examined during temporally extended and follow-up sessions.

METHOD

Participants and Setting

The participants were 4 individuals who had been diagnosed with mental retardation. All had been admitted to an inpatient unit for the assessment and treatment of behavior disorders. Their families requested that compliance with wearing existing prescription glasses be addressed during the admission. Anthony was a 14-year-old boy with autistic disorder, moderate mental retardation, mood disorder, attention deficit hyperactivity disorder, and a sleep disorder. Denzel was a 19-year-old boy with severe mental retardation, autistic disorder, cerebral palsy, and a seizure disorder. Jordan was a 4-year-old boy with autistic disorder and severe mental retardation. Karena was an 18-year-old girl with Down syndrome and moderate mental retardation. Ophthalmologic diagnoses included myopia (Anthony), myopic astigmatism (Denzel), hyperopia (Jordan), and hyperoptic astigmatism and nystagmus (Karena). Unless otherwise indicated, sessions were conducted in a treatment room (3 m by 3 m) that contained tables, chairs, and materials needed to conduct sessions.

Data Collection and Interobserver Agreement

Trained observers used laptop computers to record the frequency of glasses removal and attempts to remove glasses (during response blocking) and the duration of independent glasses wearing. During conditions that included brief response blocking, wearing glasses was considered independent only if it occurred after blocking was discontinued. A second observer independently collected data during 49% of sessions across participants. For purposes of interobserver agreement, each session was divided into 10-s intervals. Agreement on removals and attempts was scored if both observers recorded the same number of responses in the interval. Agreement coefficients for removals and attempts were calculated by dividing the number of agreements per session by the number of agreements plus disagreements and multiplying by 100%. For duration of independent glasses wearing, the lower duration per interval was divided by the higher duration, averaged across all intervals, and multiplied by 100%. Mean interobserver agreement percentages across participants for removals, attempts, and duration of independent glasses wearing were 99%, 99%, and 97%, respectively.

Procedure and Experimental Design

Treatment evaluations for 3 of the participants occurred in four stages. Anthony participated in the first stage only, because he began to wear his prescription glasses independently during Stage 1. Sessions were 10 min long except for periodic extensions in Stage 4 (indicated in Figure 1). All conditions began with the therapist placing the glasses on the participant. Throughout the study, removal of the glasses resulted in a 30-s escape from wearing the glasses to simulate what seemed likely to occur in natural settings. For Denzel, Karena, and Jordan, mock glasses (plastic sunglasses with no lenses) were used during Stages 1, 2, and 3 to prevent damage to the prescription lenses. Prescription glasses were introduced during Stage 4.

Baseline and noncontingent reinforcement. First, we compared the duration of independent

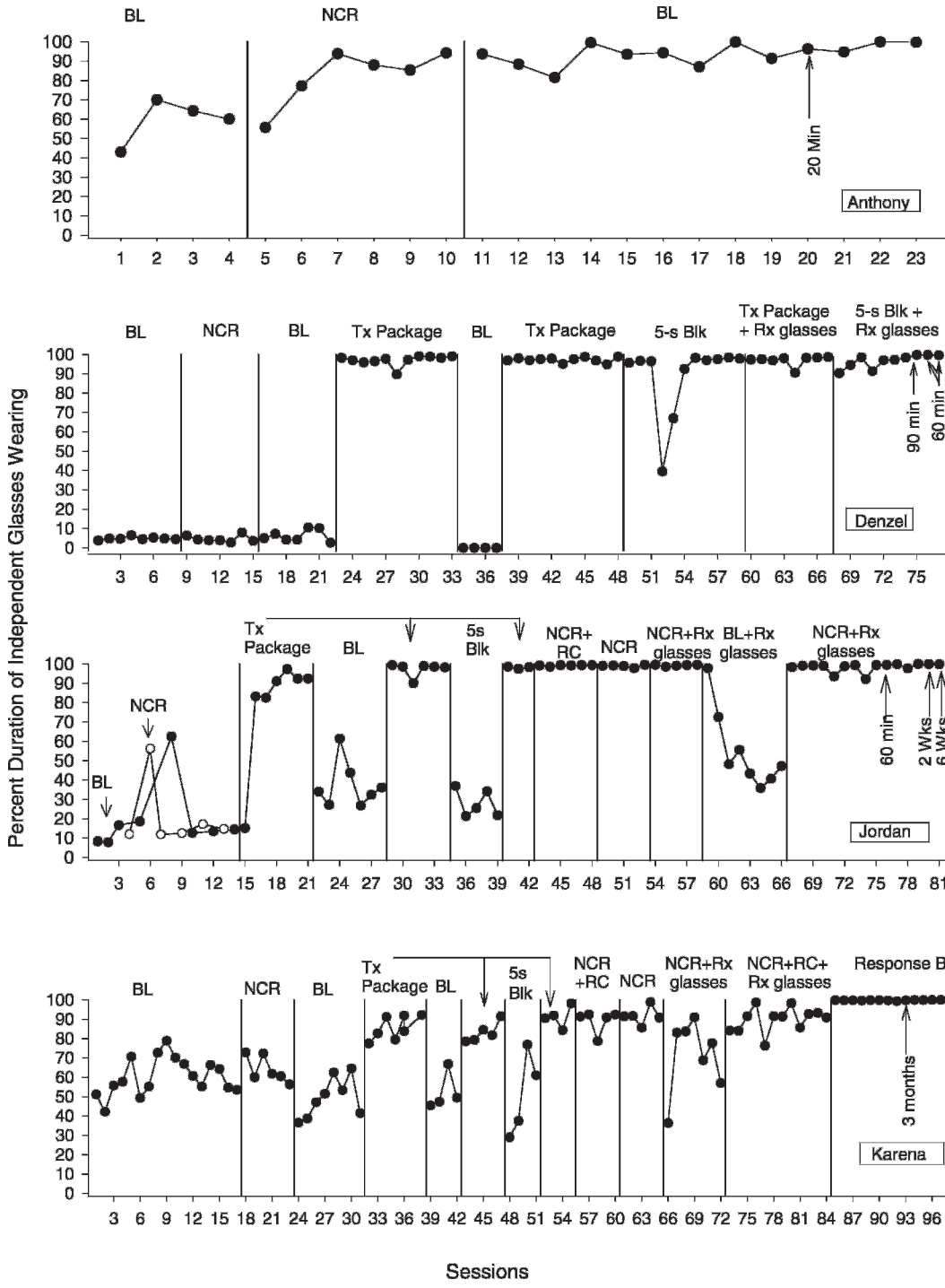

Figure 1. Percentage of session duration of independent wearing of prescription or mock glasses during all conditions (BL = baseline; NCR = noncontingent reinforcement; 5-s (second) block; RC = response cost; Tx package = NCR, 5-s response block, and response cost; Rx glasses = prescription glasses) for all 4 participants.

glasses wearing during baseline and noncontingent reinforcement (NCR) conditions. The comparison was made using a multielement design for Jordan and a reversal design for Anthony, Denzel and Karena. During baseline, glasses removal resulted in a 30-s escape from wearing glasses, after which the therapist replaced the glasses. No other materials or interaction was provided. During NCR sessions, participants had continuous access to items identified via paired-choice preference assessments (Fisher et al., 1992), and therapists interacted continuously or upon request with the participants. This comparison was conducted to establish baseline levels of independent glasses wearing, to rule out a positive reinforcement function for glasses removal (i.e., similar rates of glasses removal in enriched and impoverished environments suggest that attention and tangible reinforcement were not maintaining removals) and as an initial evaluation of the effects of distraction on independent wearing of glasses.

Treatment package evaluation. An intervention consisting of NCR (as described above), a brief (5-s) response blocking procedure, and response cost was evaluated using reversal designs. Brief response blocking involved physically blocking attempts to remove the glasses until 5 s had elapsed without an attempt. Once 5 s had elapsed, the participant was free to remove his or her glasses. Brief response blocking was used because continuous blocking seemed less practical and, thus, less likely to be implemented. Blocking was initiated at the beginning of each session and after each replacement of the glasses. Response cost involved withdrawal of preferred items and attention for 30 s contingent on each removal of the glasses.

Component analysis. Individual treatment components were evaluated to identify the components necessary for sustained independent wearing of glasses. Components were generally evaluated in the following order: response blocking only, NCR plus response cost only, NCR only. If brief response blocking produced sustained independent wearing of glasses, the component analysis ended. If response blocking was ineffective, the entire treatment package was reimplemented before NCR plus response cost was evaluated. If NCR plus response cost was effective, treatment was faded to NCR alone to determine if treatment effects would be maintained following a history with response cost. This sequence of conditions was based on the ease and intrusiveness of the procedures (because NCR was already shown to be ineffective, 5-s blocking seemed to be the next less intrusive and effortful procedure).

Treatment maintenance and generalization. The component associated with increased compliance was evaluated using each participant's prescription glasses (first introduced during a brief return to the entire intervention for Denzel). If independent glasses wearing decreased, additional components were added to reestablish high levels. Also, continuous blocking was implemented for Karena in the final phase. Sessions at that point were conducted in a general-purpose area on the unit for Denzel and Karena. The areas contained tables, chairs, and a variety of educational and recreational materials, and other patients and staff were typically present. For Jordan, sessions were conducted in the original treatment rooms during the first NCR with prescription glasses phase and then moved to the general-purpose area after a return to baseline. Session length was extended to 60 min (Jordan and Karena) or 60 to 90 min (Denzel). Follow-up data were collected at 2 and 6 weeks for Jordan and 12 weeks for Karena.

RESULTS AND DISCUSSION

Figure 1 depicts the percentage of session duration with independent glasses wearing during all phases for the 4 participants. Except for Anthony, the percentages were similar across baseline and initial NCR conditions. These data

revealed that removal of mock glasses persisted in both barren and enriched environments for Denzel, Karena, and Jordan. The percentage for Anthony increased steadily, resulting in a mean of 92% during the second baseline phase. Implementation of the treatment package produced increases in independent wearing of mock glasses for Denzel, Jordan, and Karena. However, the mean during treatment for Karena (84%) was lower than for Denzel and Jordan. Rates of removals and attempts at removal (not depicted) also decreased substantially (data available from the first author).

During the component analyses, the 5-s blocking procedure alone sustained glasses wearing for Denzel but not for Jordan or Karena. NCR plus response cost and subsequently NCR alone proved to be sufficient to maintain high levels of wearing glasses for Jordan and Karena. After the prescription glasses were introduced, brief blocking ultimately was effective again for Denzel, as was NCR alone for Jordan. However, NCR failed to sustain high levels of wearing glasses for Karena. Response cost was reimplemented, which produced an increase in glasses wearing. Continuous blocking, introduced in an attempt to further increase the percentage, resulted in an increase in glasses wearing to 99.8%. Although this percentage is inflated by restricted opportunity to remove the glasses, the final procedure resulted in low levels of removals and attempts (0 and 0.1 responses per minute, respectively). Anecdotal report and less formal data collection conducted after the study for 3 participants revealed they wore their glasses continuously (Anthony) or for over 90% of 30-min momentary time-sampling intervals (Denzel and Anthony).

The results demonstrate that the treatment package increased wearing glasses among individuals with mental retardation, but that not all of the components were necessary continuously. However, the design of the study did not permit us to identify conclusively the variables that controlled glasses removal, and the idiosyncratic outcomes make it difficult to specify the mechanisms that were responsible for the intervention's effectiveness. It is possible that any aversive properties of wearing glasses decreased simply as a function of repeated or prolonged exposure, a process sometimes termed sensory adaptation (Domjan & Burkhard, 1986). This is perhaps supported by the observation that NCR alone resulted in sustained glasses wearing after, but not before, prolonged exposure to the glasses for some participants. If so, then the critical effects of the intervention may be simply to extend the length of time that the individual is exposed to the glasses, allowing these processes to run their course. Still, counterconditioning and, later, contact with the natural contingencies of wearing prescription glasses (improved visual acuity) also may have played a role. Future efforts may be able to streamline the procedures further by identifying the critical mechanisms more directly and extend the procedures to other forms of prosthetic correction (e.g., hearing aids).

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